

JVC

SERVICE MANUAL

COLOUR TELEVISION

AV-28ED5BN, AV-28ED5SN

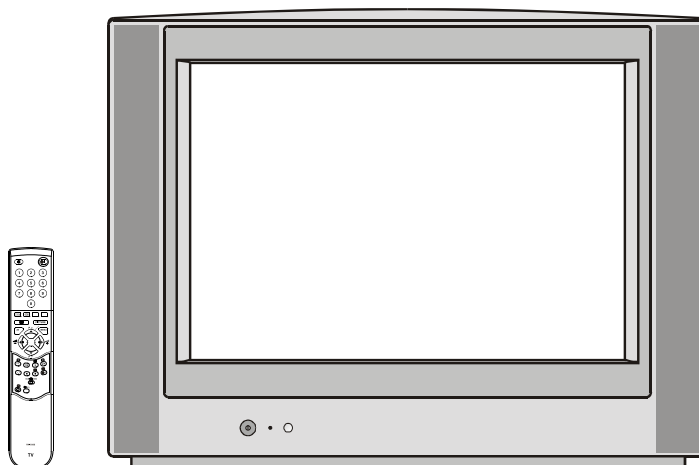


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SPECIFICATION

Items		Contents
Dimensions (W × H × D)		76.0cm × 57.0cm × 47.3cm
Mass		33kg
TV RF System		CCIR (B/G, D/K, L)
Colour System		PAL SECAM NTSC3.58 / NTSC4.43 (Only EXT mode)
Stereo System		A2 (B/G, D/K) / NICAM (B/G, D/K, L)
Receiving Frequency	VHF	47MHz - 470MHz
	UHF	470MHz - 862MHz
Intermediate Frequency	VIF	38.9MHz (B/G, D/K, L) 33.9MHz (L')
	SIF	33.4MHz (5.5MHz :B/G) 32.4MHz (6.5MHz :D/K, L)
Colour Sub Carrier Frequency	PAL	4.43MHz
	SECAM	4.40625MHz / 4.25MHz
	NTSC	3.58MHz / 4.43MHz
Teletext System		FLOF (Fastext)
Power Input		AC220V - AC240V, 50Hz
Power Consumption		150W, Standby : 3W
Picture Tube		Visible size : 66.6cm (28"), Measured diagonally (H: 53.3cm × V: 40.0cm)
High Voltage		30.0kV (at zero beam current)
Speaker	MAIN	5.7cm × 16cm oval type × 2
	TWEETER	5cm × 2
Audio Power Output		10W + 10W
Aerial Input Terminal		75Ω unbalanced, coaxial
EXT-1 / EXT-2 (Input / Output)		21-pin Euro connector (SCART socket × 2)
EXT-3 (Input)	Video	1V(p-p) positive, negative sync provided, 75Ω, RCA pin jack × 1
	Audio	500mV(rms) (-4dBs), high impedance, RCA pin jack × 2
Headphone Jack		Stereo mini jack (Ø3.5mm × 1)
Remote Control Unit		RM-C86S (AA/R6 dry cell battery × 2)

Design & specifications are subject to change without notice.

SECTION 1

PRECAUTION

1.1 SAFETY PRECAUTIONS

- (1) The design of this product contains special hardware, many circuits and components specially for safety purposes. For continued protection, no changes should be made to the original design unless authorized in writing by the manufacturer. Replacement parts must be identical to those used in the original circuits. Service should be performed by qualified personnel only.
- (2) Alterations of the design or circuitry of the products should not be made. Any design alterations or additions will void the manufacturer's warranty and will further relieve the manufacturer of responsibility for personal injury or property damage resulting therefrom.
- (3) Many electrical and mechanical parts in the products have special safety-related characteristics. These characteristics are often not evident from visual inspection nor can the protection afforded by them necessarily be obtained by using replacement components rated for higher voltage, wattage, etc. Replacement parts which have these special safety characteristics are identified in the parts list of Service manual. **Electrical components having such features are identified by shading on the schematics and by (Δ) on the parts list in Service manual.** The use of a substitute replacement which does not have the same safety characteristics as the recommended replacement part shown in the parts list of Service manual may cause shock, fire, or other hazards.
- (4) **Don't short between the LIVE side ground and ISOLATED (NEUTRAL) side ground or EARTH side ground when repairing.**
Some model's power circuit is partly different in the GND. The difference of the GND is shown by the LIVE : ($\perp$) side GND, the ISOLATED (NEUTRAL) : ($\equiv$) side GND and EARTH : ($\oplus$) side GND.
Don't short between the LIVE side GND and ISOLATED (NEUTRAL) side GND or EARTH side GND and never measure the LIVE side GND and ISOLATED (NEUTRAL) side GND or EARTH side GND at the same time with a measuring apparatus (oscilloscope etc.). If above note will not be kept, a fuse or any parts will be broken.
- (5) If any repair has been made to the chassis, it is recommended that the B1 setting should be checked or adjusted (See ADJUSTMENT OF B1 POWER SUPPLY).
- (6) The high voltage applied to the picture tube must conform with that specified in Service manual. Excessive high voltage can cause an increase in X-Ray emission, arcing and possible component damage, therefore operation under excessive high voltage conditions should be kept to a minimum, or should be prevented. If severe arcing occurs, remove the AC power immediately and determine the cause by visual inspection (incorrect installation, cracked or melted high voltage harness, poor soldering, etc.). To maintain the proper minimum level of soft X-Ray emission, components in the high voltage circuitry including the picture tube must be the exact replacements or alternatives approved by the manufacturer of the complete product.
- (7) Do not check high voltage by drawing an arc. Use a high voltage meter or a high voltage probe with a VTVM. Discharge the picture tube before attempting meter connection, by connecting a clip lead to the ground frame and connecting the other end of the lead through a 10k Ω 2W resistor to the anode button.

- (8) When service is required, observe the original lead dress. Extra precaution should be given to assure correct lead dress in the high voltage circuit area. Where a short circuit has occurred, those components that indicate evidence of overheating should be replaced. Always use the manufacturer's replacement components.

- (9) **Isolation Check (Safety for Electrical Shock Hazard)**
After re-assembling the product, always perform an isolation check on the exposed metal parts of the cabinet (antenna terminals, video/audio input and output terminals, Control knobs, metal cabinet, screw heads, earphone jack, control shafts, etc.) to be sure the product is safe to operate without danger of electrical shock.

a) Dielectric Strength Test

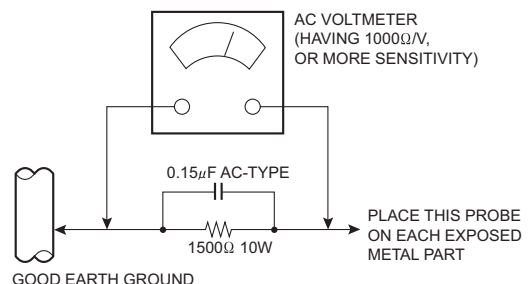
The isolation between the AC primary circuit and all metal parts exposed to the user, particularly any exposed metal part having a return path to the chassis should withstand a voltage of 3000V AC (r.m.s.) for a period of one second. (. . . Withstand a voltage of 1100V AC (r.m.s.) to an appliance rated up to 120V, and 3000V AC (r.m.s.) to an appliance rated 200V or more, for a period of one second.) This method of test requires a test equipment not generally found in the service trade.

b) Leakage Current Check

Plug the AC line cord directly into the AC outlet (do not use a line isolation transformer during this check.). Using a "Leakage Current Tester", measure the leakage current from each exposed metal part of the cabinet, particularly any exposed metal part having a return path to the chassis, to a known good earth ground (water pipe, etc.). Any leakage current must not exceed 0.5mA AC (r.m.s.). However, in tropical area, this must not exceed 0.2mA AC (r.m.s.).

Alternate Check Method

Plug the AC line cord directly into the AC outlet (do not use a line isolation transformer during this check.). Use an AC voltmeter having 1000 Ω per volt or more sensitivity in the following manner. Connect a 1500 Ω 10W resistor paralleled by a 0.15 μ F AC-type capacitor between an exposed metal part and a known good earth ground (water pipe, etc.). Measure the AC voltage across the resistor with the AC voltmeter. Move the resistor connection to each exposed metal part, particularly any exposed metal part having a return path to the chassis, and measure the AC voltage across the resistor. Now, reverse the plug in the AC outlet and repeat each measurement. Any voltage measured must not exceed 0.75V AC (r.m.s.). This corresponds to 0.5mA AC (r.m.s.). However, in tropical area, this must not exceed 0.3V AC (r.m.s.). This corresponds to 0.2mA AC (r.m.s.).



SECTION 2

SPECIFIC SERVICE INSTRUCTIONS

2.1 FEATURES

3D CINEMA SOUND

You can enjoy sounds with a wider ambience.

ZOOM

This function can change the screen size according to the picture aspect ratio.

T-V LINK

When you have a T-V LINK compatible VCR connected to the EXT-2 Terminal on the TV, it is easier to set up the VCR and to view videos.

COLOUR SYSTEM

If the picture is not clear or no colour appears, change the current colour system to another colour system.

2.2 MAIN DIFFERENCE LIST

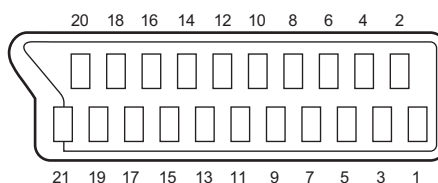
Items	AV-28ED5BN	AV-28ED5SN
CABINET COLOUR	BLACK	SILVER

2.3 21-PIN EURO CONNECTOR (SCRAT) : EXT-1 / EXT-2

Pin No.	Signal designation	Matching value	EXT-1	EXT-2
1	AUDIO R output	500mV(rms) (Nominal), Low impedance	Used (TV OUT)	Used (LINE OUT)
2	AUDIO R input	500mV(rms) (Nominal), High impedance	Used (R1)	Used (R2)
3	AUDIO L output	500mV(rms) (Nominal), Low impedance	Used (TV OUT)	Used (LINE OUT)
4	AUDIO GND	---	Used	Used
5	GND (B)	---	Used	Used
6	AUDIO L input	500mV(rms) (Nominal), High impedance	Used (L1)	Used (L2)
7	B input	700mV _(B-W) , 75 Ω	Used	Not used
8	FUNCTION SW (SLOW SW)	Low : 0V-3V, High : 8V-12V, High impedance	Used	Used
9	GND (G)	---	Used	Used
10	SCL / T-V LINK	---	Not used	Used (SCL / T-V LINK)
11	G input	700mV(B-W), 75 Ω	Used	Not used
12	SDA3	---	Not used	Used
13	GND (R)	---	Used	Used
14	GND (YS)	---	Used	Not used
15	R / C input	R : 700mV _(B-W) , 75 Ω C : 300mV _(P-P) , 75 Ω	Used (R)	Used (C)
16	Ys input (FAST SW)	Low : 0V-0.4V, 75 Ω High : 1V-3V, 75 Ω	Used	Not used
17	GND (VIDEO output)	---	Used	Used
18	GND (VIDEO input)	---	Used	Used
19	VIDEO output	1V _(P-P) (Negative sync), 75 Ω	Used (TV OUT)	Used (LINE OUT)
20	VIDEO / Y input	1V _(P-P) (Negative sync), 75 Ω	Used	Used
21	COMMON GND	---	Used	Used

(P-P= Peak to Peak, B-W= Blanking to white peak)

[Pin assignment]



SECTION 3 DISASSEMBLY

3.1 DISASSEMBLY PROCEDURE

3.1.1 REMOVING THE REAR COVER

- (1) Unplug the power cord.
- (2) Remove the 8 screws **[A]** as shown in the Fig. 1.
- (3) Remove the 4 screws **[B]**.
- (4) Withdraw the REAR COVER toward you.

3.1.2 REMOVING THE BACK DOOR

- Remove the REAR COVER
 - (1) Remove the 2 screws **[C]**.
 - (2) Withdraw the BACK DOOR toward you.

3.1.3 REMOVING THE MAIN PWB

- Remove the REAR COVER.
- Remove the BACK DOOR.
 - (1) Remove the 4 screws **[D]**.
 - (2) Remove the MAIN PWB.

CAUTION :

If necessary, take off the wire clamp, connectors etc.
Be careful enough when developing a MAIN PWB.

3.1.4 REMOVING THE FEATURE BOX PWB

- Remove the REAR COVER.
- Remove the BACK DOOR.
 - (1) Disconnect the connector PL423 and PL424 on the MAIN PWB.
 - (2) Raise up the both sides and disconnect the FEATURE BOX PWB.

3.1.5 REMOVING THE SIDE CONTROL PWB

- Remove the REAR COVER.
 - (1) Remove the 4 screws **[E]**.
 - (2) Remove the SIDE CONTROL PWB.

3.1.6 REMOVING THE BASE

- Remove the REAR COVER.
 - (1) Remove the 2 screws **[F]**.
 - (2) Remove the BASE.

NOTE:

Work after fixing so that a CRT screen may be placed upside down or it may not fall.

3.1.7 REMOVING THE POWER SWITCH PWB

- Remove the REAR COVER.
 - (1) Remove the 2 screws **[G]**, and remove the POWER SWITCH PWB.

3.1.8 REMOVING THE LED PWB

- Remove the REAR COVER.
- Remove the POWER SWITCH PWB.
 - (1) Remove the 2 screws **[H]**, and remove the LED PWB.

3.1.9 REMOVING THE SPEAKER and TWEETER

- Remove the REAR COVER.
 - (1) Remove the 4 screws **[I]**, and remove the SPEAKER.
 - (2) Remove the other hand SPEAKER in the same steps.
 - (3) Remove the 2 screws **[J]**, and remove the TWEETER.
 - (4) Remove the other hand TWEETER in the same steps.

3.1.10 CHECKING THE PW BOARD

- To check the back side of the PW Board.
 - (1) Pull out the PW Board. (Refer to REMOVING THE MAIN PWB).
 - (2) Erect the PW Board vertically so that you can easily check the back side of the PW Board.

CAUTION :

- When erecting the PW Board, be careful so that there will be no contacting with other PW Board.
- Before turning on power, make sure that the wire connector is properly connected.
- When conducting a check with power supplied, be sure to confirm that the CRT EARTH WIRE (BRAIDED ASS'Y) is connected to the CRT SOCKET PW board.

3.1.11 WIRE CLAMPING AND CABLE TYING

- (1) Be sure to clamp the wire.
- (2) Never remove the cable tie used for tying the wires together.
Should it be inadvertently removed, be sure to tie the wires with a new cable tie.

REAR COVER

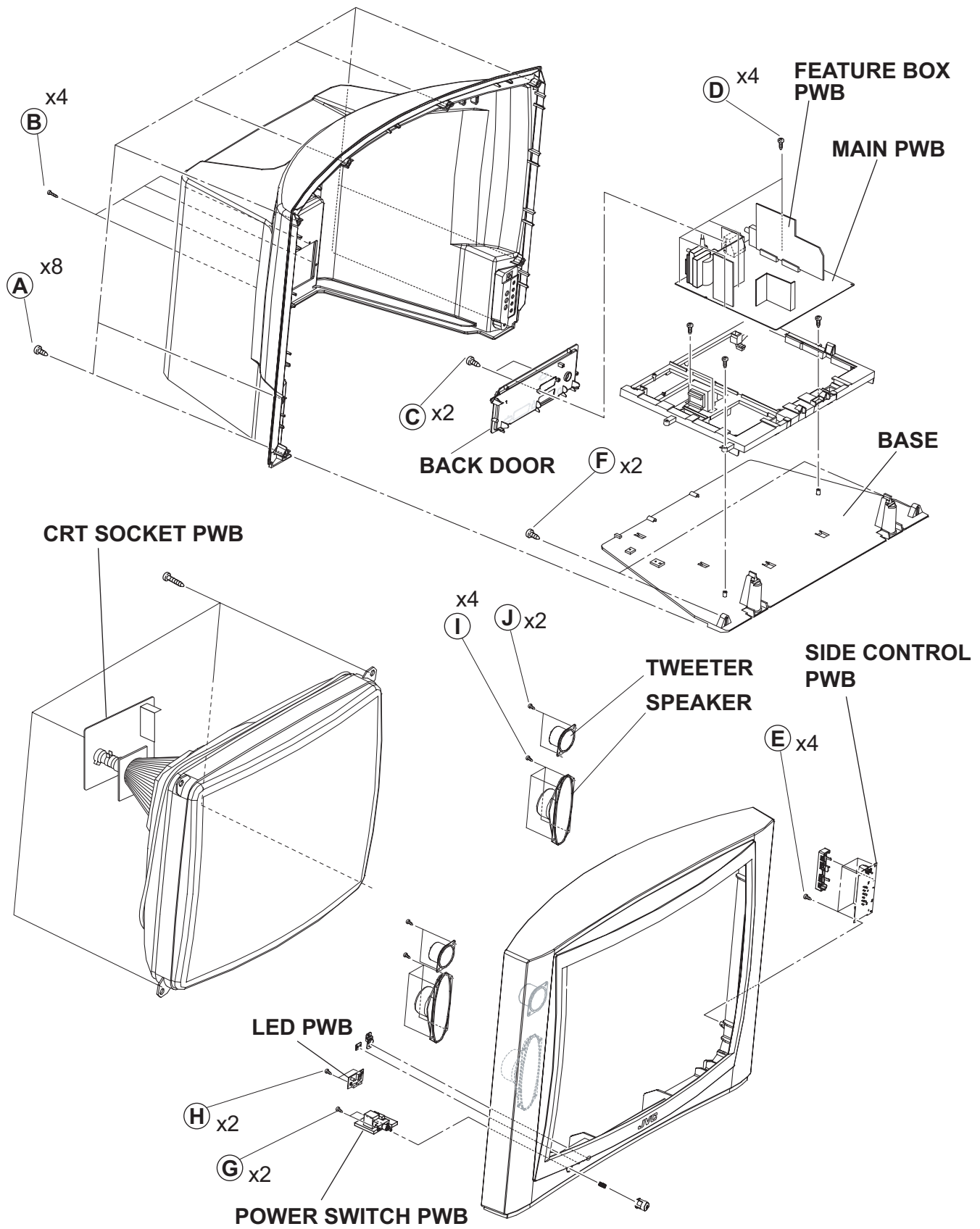


Fig.1

3.2 MEMORY IC REPLACEMENT

- This model uses the memory IC.
- This memory IC stores data for proper operation of the video and drive circuits.
- When replacing, be sure to use an IC containing this (initial value) data.

3.2.1 SETTINGS OF FACTORY SHIPMENT

3.2.1.1 BUTTON OPERATION

Setting item	Setting position
POWER	Off
CHANNEL	PR1

3.2.1.2 REMOTE CONTROL DIRECT OPERATION

Setting item	Setting position
CHANNEL	PR1
ZOOM	AUTO

3.2.1.3 REMOTE CONTROL MENU OPERATION

(1) PICTURE

Setting item	Setting position
Picture Mode	Standard
Brightness	Centre
Contrast	Centre
Colour	Centre
Sharpness	Centre
Colour Temp	Centre
Noise reduction	OFF
Zoom	AUTO

(2) SOUND

Setting item	Setting position
Volume	Centre
Balance	Centre
Bass	Centre
Treble	Centre
Hyper Sound	OFF
3D SOUND	OFF

(3) INSTALL

Setting item	Setting position
LANGUAGE	English
COUNTRY	English
PROGRAM	Reset

(4) FEATURE

Setting item	Setting position
Sleeptimer	OFF
Child lock	OFF
EXT-2 Output	TV
Blue Back	OFF

3.3 REPLACEMENT OF CHIP COMPONENT

3.3.1 CAUTIONS

- (1) Avoid heating for more than 3 seconds.
- (2) Do not rub the electrodes and the resist parts of the pattern.
- (3) When removing a chip part, melt the solder adequately.
- (4) Do not reuse a chip part after removing it.

3.3.2 SOLDERING IRON

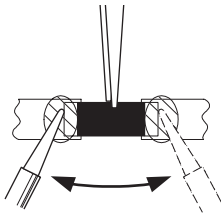
- (1) Use a high insulation soldering iron with a thin pointed end of it.
- (2) A 30w soldering iron is recommended for easily removing parts.

3.3.3 REPLACEMENT STEPS

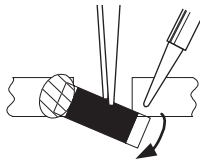
1. How to remove Chip parts

[Resistors, capacitors, etc.]

- (1) As shown in the figure, push the part with tweezers and alternately melt the solder at each end.



- (2) Shift with the tweezers and remove the chip part.

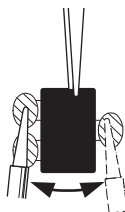


[Transistors, diodes, variable resistors, etc.]

- (1) Apply extra solder to each lead.



- (2) As shown in the figure, push the part with tweezers and alternately melt the solder at each lead. Shift and remove the chip part.



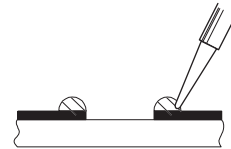
NOTE :

After removing the part, remove remaining solder from the pattern.

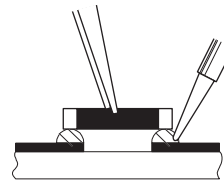
2. How to install Chip parts

[Resistors, capacitors, etc.]

- (1) Apply solder to the pattern as indicated in the figure.

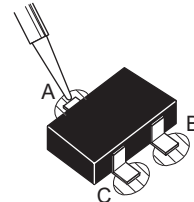


- (2) Grasp the chip part with tweezers and place it on the solder. Then heat and melt the solder at both ends of the chip part.

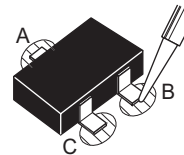


[Transistors, diodes, variable resistors, etc.]

- (1) Apply solder to the pattern as indicated in the figure.
- (2) Grasp the chip part with tweezers and place it on the solder.
- (3) First solder lead **A** as indicated in the figure.



- (4) Then solder leads **B** and **C**.



SECTION 4 ADJUSTMENT

4.1 ADJUSTMENT PREPARATION

- (1) You can make the necessary adjustments for this unit with either the Remote Control Unit or with the adjustment tools and parts as given below.
- (2) Adjustment with the Remote Control Unit is made on the basis of the initial setting values, however, the new setting values which set the screen to its optimum condition may differ from the initial settings.
- (3) Make sure that AC power is turned on correctly.
- (4) Turn on the power for set and test equipment before use, and start the adjustment procedures after waiting at least 30 minutes.
- (5) Unless otherwise specified, prepare the most suitable reception or input signal for adjustment.
- (6) Never touch any adjustment parts which are not specified in the list for this adjustment - variable resistors, transformers, condensers, etc.
- (7) Presetting before adjustment.
Unless otherwise specified in the adjustment instructions, preset the following functions with the remote control unit:

Setting item	Setting value
BRIGHTNESS	Centre
CONTRAST	
COLOUR	
SHARPNESS	
COLOUR TEMP	NORMAL
ZOOM	AUTO

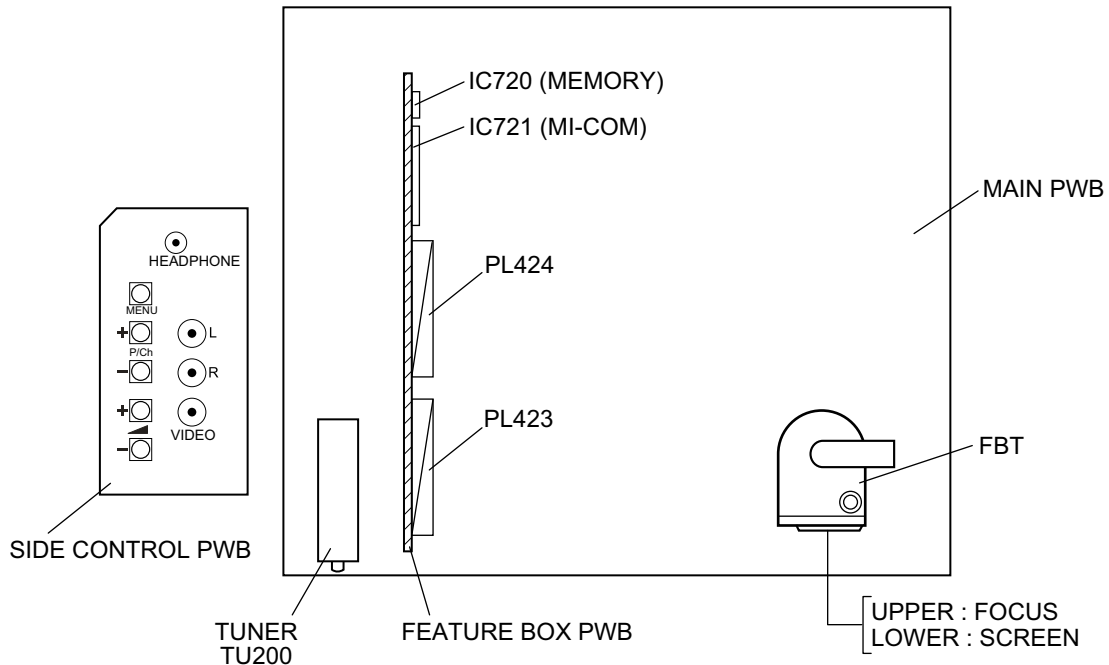
4.2 MEASURING EQUIPMENT

- (1) DC voltmeter (or digital voltmeter)
- (2) Signal generator (Pattern generator)
: [PAL / SECAM / NTSC]
- (3) Remote control unit

4.3 ADJUSTMENT ITEM

- FOCUS ADJUSTMENT
- SCREEN ADJUSTMENT
- AGC ADJUSTMENT
- DEFLECTION CIRCUIT ADJUSTMENT
- VIDEO CIRCUIT ADJUSTMENT

4.4 ADJUSTMENT LOCATIONS



4.5 BASIC OPERATION OF SERVICE MODE

4.5.1 HOW TO ENTER THE SERVICE MODE

- (1) Press the **INFORMATION** key and **MUTING** key simultaneously, and the SERVICE MENU 1 screen (Fig.1) will be displayed.

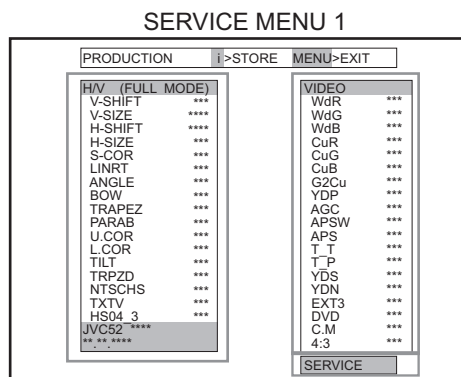


Fig.1

- (2) While the SERVICE MENU 1 screen is displayed, press the **BLUE** key for access to the SERVICE MENU 2 (Fig.2).

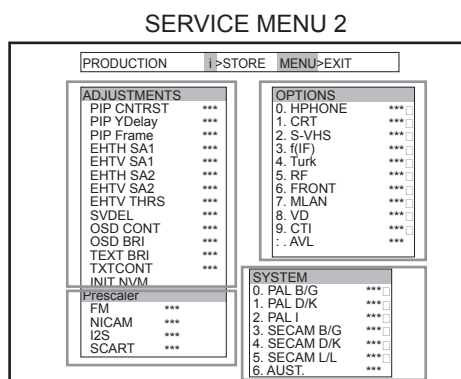


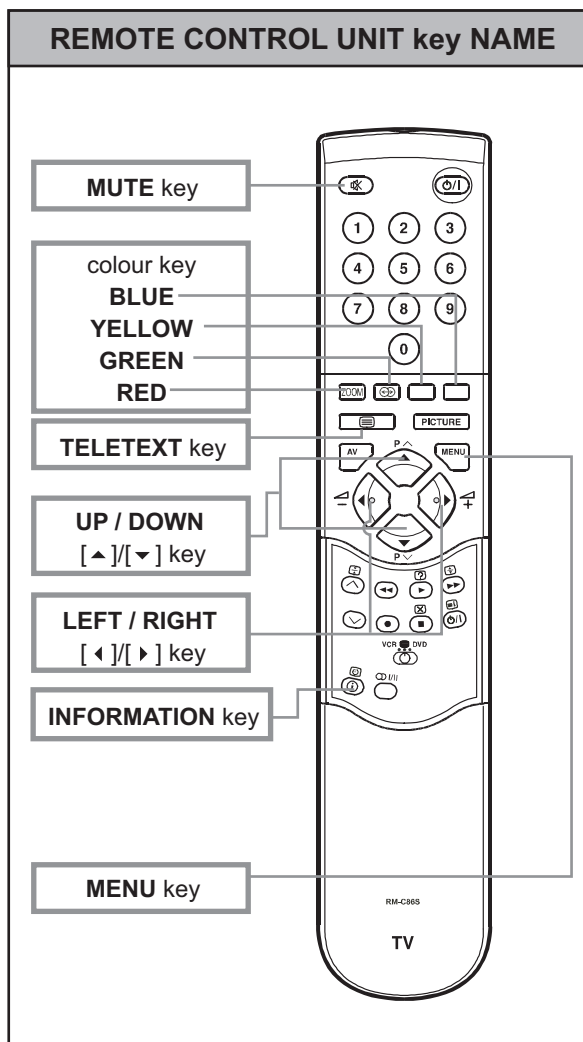
Fig.2

4.5.2 SELECTION OF ADJUSTMENT ITEMS

- (1) Enter the SERVICE MODE
- (2) Press the **COLOUR** (**RED**, **GREEN**, **YELLOW** or **BLUE**) key and select the SERVICE MENU 1 section. (refer to next page.)
- (3) Press the FUNCTION [▲]/[▼] key to select the adjustment item.
- (4) Press the FUNCTION [◀]/[▶] key to set the setting value.
- (5) Press the **[INFORMATION]** key to store the setting value.

4.5.3 HOW TO EXIT SERVICE MODE

- (1) Press the **[MENU]** key.



4.5.4 COLOUR KEY FUNCTION AND SCREEN DISPLAY

Colour key function in the SERVICE MENU

Colour key	Press time	Select menu
RED	once	H/V
	twice	---
GREEN	once	VIDEO
	twice	---
YELLOW	once	---
	twice	---
BLUE	once	SERVICE (SERVICE MENU 2)
	twice	---

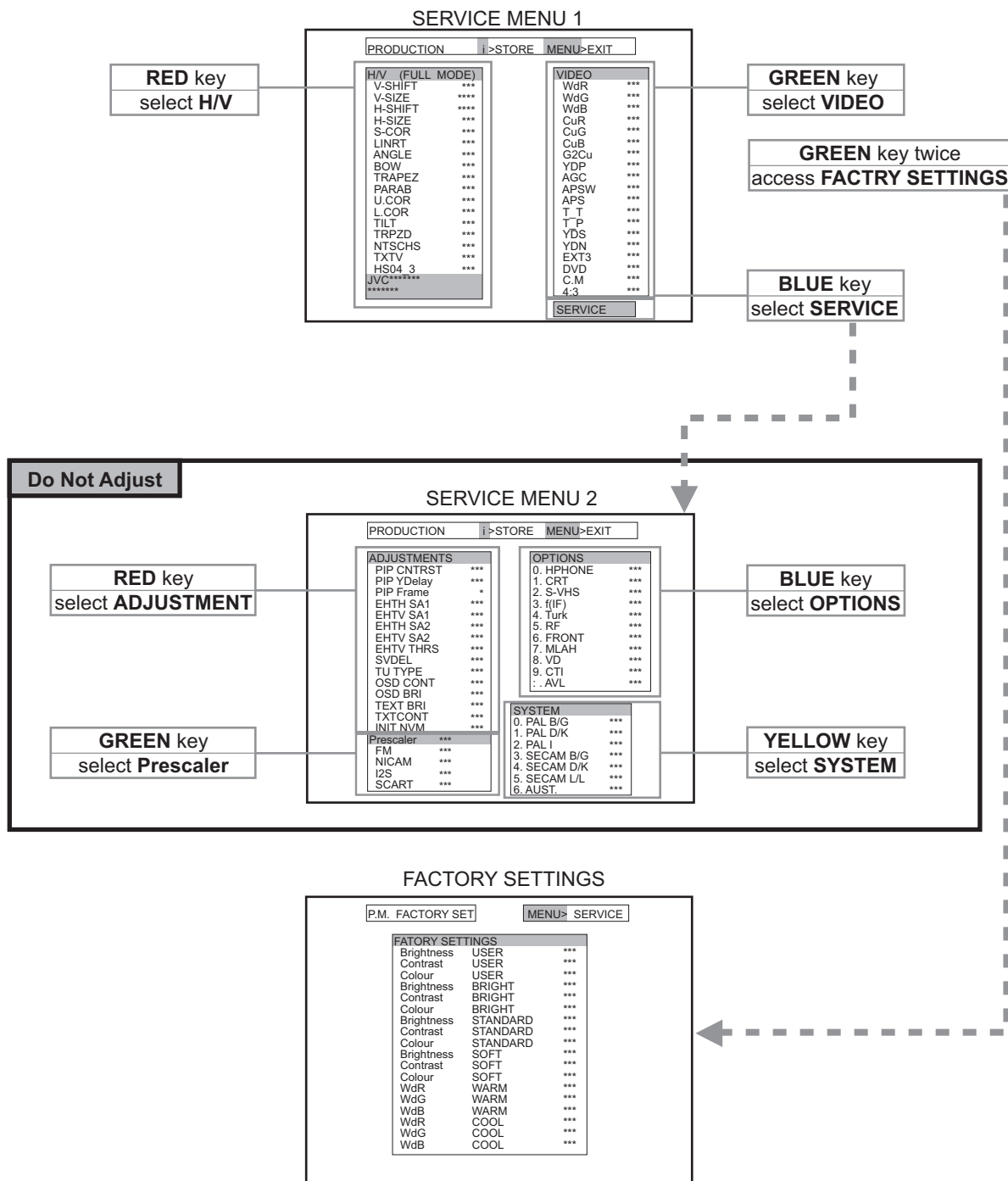
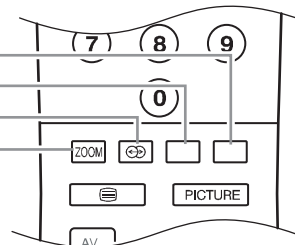
colour key location

BLUE

YELLOW

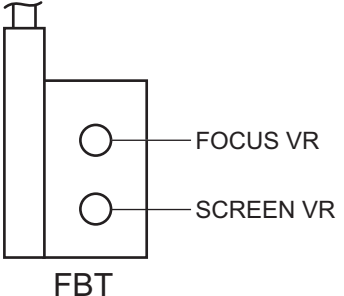
GREEN

RED



4.6 ADJUSTMENTS PROCEDURE

4.6.1 FOCUS ADJUSTMENT

Item	Measuring instrument	Test point	Adjustment part	Description
FOCUS adjustment	Signal generator Remote control unit		FOCUS VR [On the FBT]	(1) Receive a crosshatch signal. (2) Adjust FOCUS VR on the FBT for the lines to become as thin as possible. 

4.6.2 SCREEN ADJUSTMENT

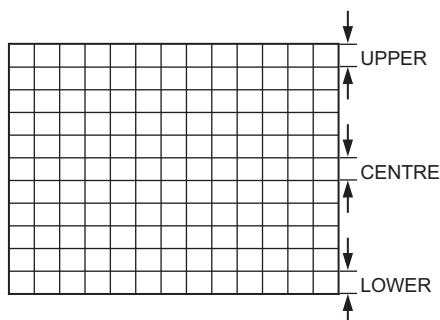
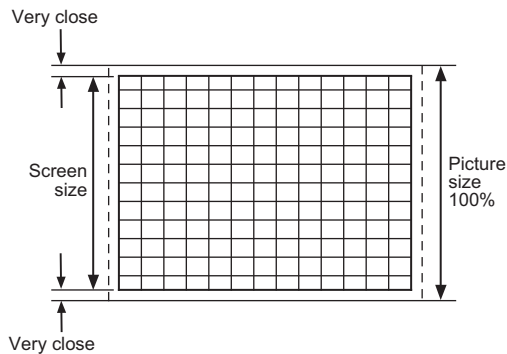
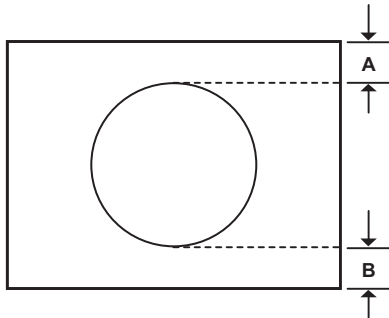
Item	Measuring instrument	Test point	Adjustment part	Description
SCREEN adjustment	Remote control unit		SCREEN VR [On the FBT]	(1) Press the [MUTING] and [INFORMATION] key at the same time to enter the SERVICE MODE. (2) Press the [BLUE] and [TELETEXT] key respectively to enter screen adjustment from the service mode. (3) Adjust the SCREEN VR until the "G2 ADJUST OK" sign appears.

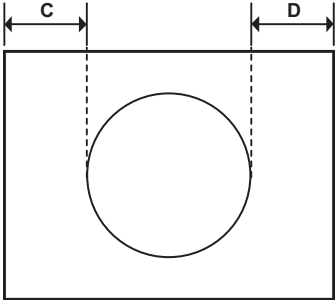
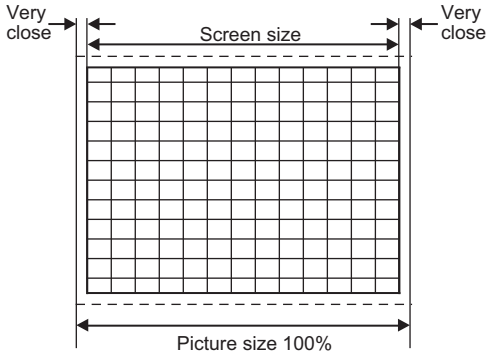
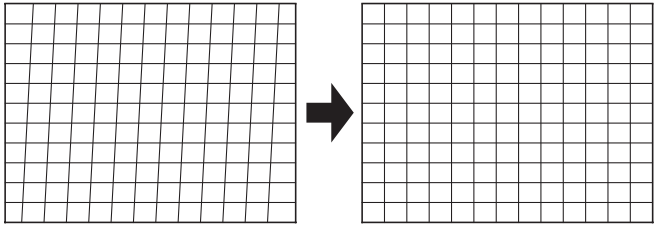
4.6.3 AGC ADJUSTMENT

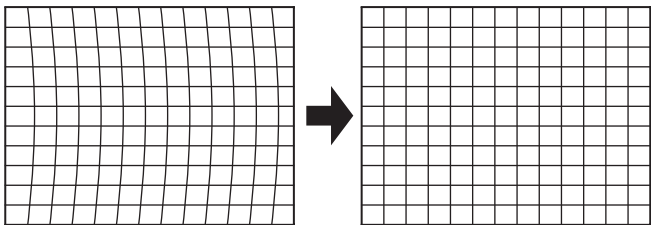
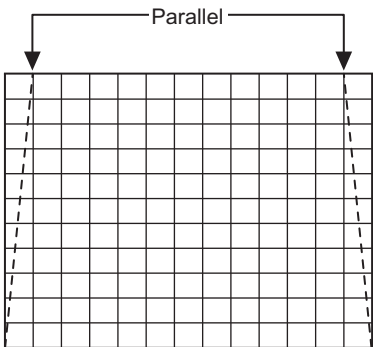
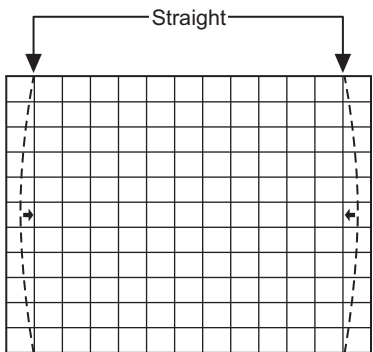
Item	Measuring instrument	Test point	Adjustment part	Description
AGC adjustment	Signal generator Remote control unit DC volt meter		AGC	(1) Receive a PAL BG signal at 60dBμV RF signal level. (2) Enter the SERVICE MODE. (3) Press the [GREEN] key to enter the VIDEO adjustment group. (4) Select AGC. (5) Adjust AGC until voltage at pin 1 of TUNER is equal to 3.0V. (6) Press the [INFORMATION] key to memorize the set value.

4.6.4 DEFLECTION CIRCUIT ADJUSTMENT

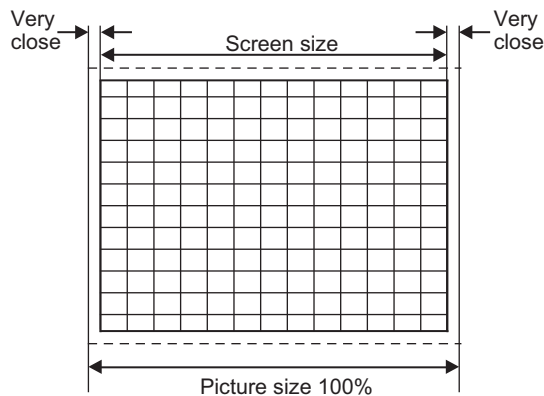
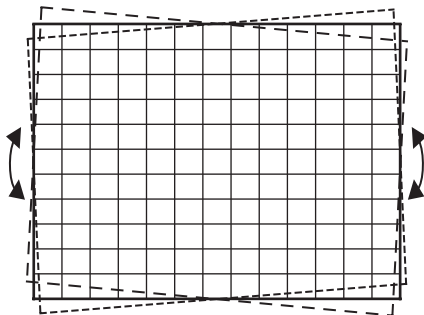
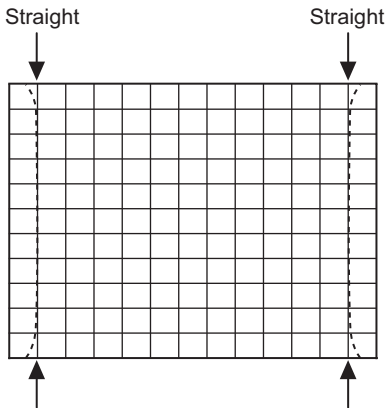
Item	Measuring instrument	Test point	Adjustment part	Description
VERTICAL SHIFT adjustment	Signal generator		V-SHIFT	(1) Receive a circle pattern signal. (2) Enter the SERVICE MODE. (3) Press the [RED] key to enter the H/V adjustment group. (4) Select V-SHIFT . (5) Adjust V-SHIFT to make A=B . (6) Check and readjust V-SHIFT item if the adjustment becomes improper after some other geometric adjustments are done. (7) Press the [INFORMATION] key to memorize the set value.
	Remote control unit			
VERTICAL SIZE adjustment	Signal generator		V-SIZE	(1) Receive a crosshatch signal. (2) Enter the SERVICE MODE. (3) Press the [RED] key to enter the H/V adjustment group. (4) Select V-SIZE . (5) Adjust V-SIZE until horizontal black lines on both the upper and lower part of the crosshatch pattern become very close to the upper and lower horizontal sides of picture size and nearly about to disappear. (6) Check and readjust V-SIZE item if the adjustment becomes improper after some other geometric adjustments are done. (7) Press the [INFORMATION] key to memorize the set value.
	Remote control unit			
VERTICAL S-CORRECTION & LINEARITY adjustment	Signal generator		S-COR	(1) Receive a crosshatch signal. (2) Enter the SERVICE MODE. (3) Press the [RED] key to enter the H/V adjustment group. (4) Select S-COR . (5) Adjust S-COR until the size of squares on both the upper and lower part of crosshatch pattern become equal to the squares laying on the vertical centre of the crosshatch pattern. (6) Check and readjust S-COR item if the adjustment becomes improper after some other geometric adjustments are done. (7) Press the [INFORMATION] key to memorize the set value. (8) Select LINRT . (9) Adjust LINRT until all the size of squares of the crosshatch pattern become in equal size from the top of the screen to its bottom of the whole screen. (10) Check and readjust LINRT item if the adjustment becomes improper after some other geometric adjustments (especially after than S-COR adjustment) are done. (11) Press the [INFORMATION] key to memorize the set value.
	Remote control unit		LINRT	

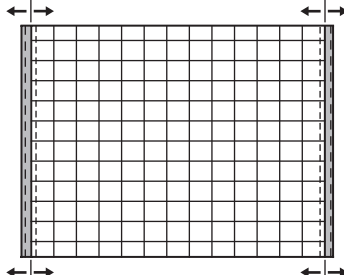


Item	Measuring instrument	Test point	Adjustment part	Description
HORIZONTAL SHIFT adjustment	Signal generator Remote control unit		H-SHIFT	(1) Receive a circle pattern signal. (2) Enter the SERVICE MODE. (3) Press the [RED] key to enter the H/V adjustment group. (4) Select H-SHIFT . (5) Adjust H-SHIFT to make C=D . (6) Check and readjust H-SHIFT item if the adjustment becomes improper after some other geometric adjustments are done. (7) Press the [INFORMATION] key to memorize the set value.
				
HORIZONTAL SIZE adjustment	Signal generator Remote control unit		H-SIZE	(1) Receive a crosshatch signal. (2) Enter the SERVICE MENU. (3) Press the [RED] key to enter the H/V adjustment group. (4) Select H-SIZE . (5) Adjust H-SIZE until no white bars on both the left and right sides of the crosshatch will be visible nor screen will be so wide. (6) Check and readjust H-SIZE item if the adjustment becomes improper after some other geometric adjustments are done. (7) Press the [INFORMATION] key to memorize the set value.
				
ANGLE adjustment	Signal generator Remote control unit		ANGLE	(1) Receive a crosshatch signal. (2) Enter the SERVICE MODE. (3) Press the [RED] key to enter the H/V adjustment group. (4) Select ANGLE . (5) Adjust ANGLE until the vertical lines of the crosshatch pattern become straight. (6) Check and readjust ANGLE item if the adjustment becomes improper after some other geometric adjustments are done. (7) Press the [INFORMATION] key to memorize the set value.
				

Item	Measuring instrument	Test point	Adjustment part	Description
BOW adjustment	Signal generator Remote control unit		BOW	(1) Receive a crosshatch signal. (2) Enter the SERVICE MODE. (3) Press the [RED] key to enter the H/V adjustment group. (4) Select BOW. (5) Adjust BOW until the vertical lines become straight. (6) Check and readjust BOW item if the adjustment becomes improper after some other geometric adjustments are done. (7) Press the [INFORMATION] key to memorize the set value. NOTE : In case where there is a bow-shaped distortion of images on the screen. (Figure)
				
TRAPEZIUM adjustment	Signal generator Remote control unit		TRAPEZ	(1) Receive a crosshatch signal. (2) Enter the SERVICE MODE. (3) Press the [RED] key to enter the H/V adjustment group. (4) Select TRAPEZ. (5) Adjust TRAPEZ until vertical lines, especially lines at the sides of the picture frame become parallel to the both sides of picture tubes as close as possible. (6) Check and readjust TRAPEZ item if the adjustment becomes improper after some other geometric adjustments are done. (7) Press the [INFORMATION] key to memorize the set value.
				
SIDE PIN adjustment	Signal generator Remote control unit		PARAB	(1) Receive a crosshatch signal. (2) Enter the SERVICE MODE. (3) Press the [RED] key to enter the H/V adjustment group. (4) Select PARAB. (5) Adjust PARAB until vertical lines close to the both sides of the picture frame become straight to vertical sides of picture tube without any bending to left or to right side of the screen. (6) Check and readjust PARAB item if the adjustment becomes improper after some other geometric adjustments are done. (7) Press the [INFORMATION] key to memorize the set value.
				

Item	Measuring instrument	Test point	Adjustment part	Description
CORNER adjustment	Signal generator		U.COR	(1) Receive a crosshatch signal. (2) Enter the SERVICE MODE. (3) Press the [RED] key to enter the H/V adjustment group. (4) Select U.COR . (5) Adjust U.COR until vertical lines at the upper corners of the picture frame become vertical and parallel to vertical corner sides of picture tube. (6) Check and readjust U.COR item if the adjustment becomes improper after some other geometric adjustments are done. (7) Select L.COR . (8) Adjust L.COR until vertical lines at the lower corners of the picture frame become vertical and parallel to vertical corner sides of picture tube. (9) Check and readjust L.COR item if the adjustment becomes improper after some other geometric adjustments are done. (10) Press the [INFORMATION] key to memorize the set value.
	Remote control unit		L.COR	
ROTATION adjustment	Signal generator		TILT	(1) Receive a crosshatch signal. (2) Enter the SERVICE MODE. (3) Press the [RED] key to enter the H/V adjustment group. (4) Select TILT . (5) Adjust TILT to rotate the complete raster clockwise and counter clockwise depending on the CRT. (6) Check and readjust TILT item if the adjustment becomes improper after some other geometric adjustments are done. (7) Press the [INFORMATION] key to memorize the set value.
	Remote control unit			
NTSC HORIZONTAL SIZE adjustment	Signal generator		NTSCHS	(1) Receive a NTSC crosshatch signal. (2) Enter the SERVICE MODE. (3) Press the [RED] key to enter the H/V adjustment group. (4) Select NTSCHS . (5) Adjust NTSCHS until no white bars on both the left and right sides of the crosshatch will be visible nor screen will be so wide. (6) Check and readjust NTSCHS item if the adjustment becomes improper after some other geometric adjustments are done. (7) Press the [INFORMATION] key to memorize the set value.
	Remote control unit			



Item	Measuring instrument	Test point	Adjustment part	Description
TELETEXT VERTICAL SIZE adjustment	Signal generator Remote control unit		TXTV	(1) Receive a crosshatch signal. (2) Enter the SERVICE MODE. (3) Press the [RED] key to enter the H/V adjustment group. (4) Select TXTV . (5) Adjust TXTV to adjust the proper vertical size of Teletext screen. (6) Check and readjust TXTV item if the adjustment becomes improper after some other geometric adjustments are done. (7) Press the [INFORMATION] key to memorize the set value.
4 : 3 TUBE adjustment	Signal generator Remote control unit		HS04_3	(1) Receive a crosshatch signal. (2) Enter the SERVICE MODE. (3) Press the [RED] key to enter the H/V adjustment group. (4) Select HS04_3 . (5) Adjust HS04_3 to adjust the proper horizontal size of 4 : 3 tube. (6) Press the [INFORMATION] key to memorize the set value.
				

4.6.5 VIDEO CIRCUIT ADJUSTMENT

Item	Measuring instrument	Test point	Adjustment part	Description
WHITE BALANCE adjustment	Signal generator Remote control unit		WdR WdG WdB	(1) Receive a black & white signal. (2) Enter the SERVICE MODE. (3) Press the [GREEN] key to enter the VIDEO adjustment group. (4) Select WdR, WdG and WdB respectively. (5) Adjust WdR, WdG and WdB respectively, until the white part turns to pure white without any other colour. (6) Press the [INFORMATION] key to memorize the set value.
COLOUR CUTOFF LEVEL adjustment	Remote control unit		CuR CuG CuB	(1) Enter the SERVICE MODE. (2) Press the [GREEN] key to enter the VIDEO adjustment group. (3) Select CuR, CuG and CuB respectively. (4) Set the values of these items as 128 (constant). (5) Press the [INFORMATION] key to memorize the set value.
PAL Y DELAY adjustment	Signal generator Remote control unit		YDP	(1) Receive a PAL colour bar signal. (2) Enter the SERVICE MODE. (3) Press the [GREEN] key to enter the VIDEO adjustment group. (4) Select YDP. (5) Adjust YDP until the colour transients on the colour bar pattern become as sharper as possible and colours between transients do not mix with each other. (6) Press the [INFORMATION] key to memorize the set value.
SECAM Y DELAY adjustment	Signal generator Remote control unit		YDS	(1) Receive a SECAM colour bar signal. (2) Enter the SERVICE MODE. (3) Press the [GREEN] key to enter the VIDEO adjustment group. (4) Select YDS. (5) Adjust YDS until the colour transients on the colour bar pattern become as sharper as possible and colours between transients do not mix with each other. (6) Press the [INFORMATION] key to memorize the set value.
NTSC Y DELAY adjustment	Signal generator Remote control unit		YDN	(1) Receive a NTSC colour bar signal from an external source (e.g. FRONT AV : EXT 4). (2) Enter the SERVICE MODE. (3) Press the [GREEN] key to enter the VIDEO adjustment group. (4) Select YDN. (5) Adjust YDN until the colour transients on the colour bar pattern become as sharper as possible and colours between transients do not mix with each other. (6) Press the [INFORMATION] key to memorize the set value.

SECTION 5

TROUBLESHOOTING

This service manual does not describe TROUBLESHOOTING.



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